Land Use and Environmental Service Agency
(Code Enforcement)

3rd Quarter

NC Mechanical Code

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100 Chapter 1 Administration

102.4 - Question: Contractor has an existing hood in a home, the kitchen is being remodeled and the cabinets are being replaced. The existing hood will be removed, new cabinets installed, the electrical and exhaust duct will remain in place and the hood will be re-installed. There is currently no make up air being supplied, will taking down the hood and re-installing it require make up air to be provided?

Answer: No, if the installation of the hood was code compliant under the code is was installed under, there is no need to update the installation for a minor alteration.

102.4 Additions, alterations or repairs. Additions, alterations, renovations or repairs to a mechanical system shall conform to that required for a new mechanical system without requiring the existing mechanical system to comply with all of the requirements of this code. Additions, alterations or repairs shall not cause an existing mechanical system to become unsafe, hazardous or overloaded.

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Minor additions, alterations, renovations and repairs to existing mechanical systems shall meet the provisions for new construction, unless such work is done in the same manner and arrangement as was in the existing system, is not hazardous and is approved.

200 Chapter 2 Definitions

300 Chapter 3 General Regulations

301.4 - Question: A ventless firebox installation for a two sided fireplace is in an assembly area. The gas code would prohibit the installation in assembly occupancies per 621.4 NCFGC, however, this is a bio-fuel so I think it would be regulated by the Mechanical Code per 101.2.5 NCFGC. The mechanical code section 301.4 would, at a minimum, requires an appliance to be listed and labeled. The logs use denatured alcohol as a fuel source and are not listed. There are natural gas logs for the fire place are listed products. Do logs burning denatured alcohol need to be listed when installed in an enclosed fireplace?

Answer: The UL listing for the 900DB covers the requirement for an approved fire box, however, the firebox is located in an Assembly occupancy, there are further restrictions for the use of Class I fuels for open flame decorative appliances. Denatured alcohol would be a class I liquid. The code reference is NC Fire Prevention Code section 308.3.1

307.2.3 - Question: Is an EZ trap still allowed by code?

Answer: Yes, the 200 series float switches, manufactured by RectorSeal are listed UL508.
See Referenced Letter from RectorSeal at the end of this agenda

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400 Chapter 4 Ventilation

401.4 - Question: Can fresh air be taken from a loading dock?

Answer: Yes, Section 401.4 #2 states that mechanical and gravity outdoor air intake openings shall be located not less than 10 feet horizontally from any hazardous or noxious contaminant source, such as streets, parking lots and loading docks.

If the intake is on the wall and the loading dock is 10 feet wide or more, this would be code compliant. A vehicle could not get within 10 feet of the intake. Consideration needs to be taken on how close the vehicle can be positioned to the intake.

401.4 Intake opening location. Air intake openings shall comply with all of the following:

1. Intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or buildings on the same lot. Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.

2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.2.1.

3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening.

4. Intake openings on structures in flood hazard areas shall be at or above the design flood level.

403 - Question: Can CO detectors be used in repair garages in lieu of exhaust?

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Answer: Yes, but only for the requirement of 403. If it is exhaust required by the Electrical Code for "Source Capture System", then it would not be allowed. See Dan Dittman's email.

From: Dittman, Daniel E [mailto:dan.dittman@ncdoi.gov]

Sent: Friday, April 25, 2014 11:57 AM

To: Rowland, Tommy D.

Subject: RE: Exhaust for Repair Garages

There are ventilation requirements in the NCMC for repair garages, but also source capture exhaust requirements in NCMC Section 502.14, and most importantly remember there are specific requirements in the NC Electrical Code that address where and how much ventilation is required dependent on the type of repair garage and the level of wiring classification. If they have a repair garage requiring mechanical ventilation due to its classification under the Electrical Code, there is not any allowance for reduction of those exhaust requirements via CO detectors.

If the repair garage is not dependent on mechanical ventilation to maintain compliance with the Electrical Code, there are still the requirements of the NCMC, which includes NCMC Section 502.14. This section clarifies that if there is a vehicle being run for diagnostic purposes, a source capture means is to be provided. This may only be one bay, or roll-around tailpipe exhaust systems can be used.

The use of Natural ventilation can be used for purposes of the occupants, but cannot be used if there are any requirements by the Electrical code, since it specifies mechanical ventilation. Natural ventilation cannot be used for the source capture system since it is specifically called out as an exhaust requirement. If natural ventilation is used for the space, the location of operable doors and louvers have to located in such a manner that the pollutants in question can be evacuated. Refer to NCMC Section 502.16, as this may occur.

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If mechanical ventilation is used as the means of ventilation, typically CO detectors alone would not be adequate to service the space, as this would not be their primary concern in a repair garage (the vehicles are not supposed to be running, and if they are there is to be a source capture system-NCMC 502.14). Hydrocarbon detectors would be more appropriate, in my opinion.

502.14 Motor vehicle operation. In areas where motor vehicles operate, mechanical ventilation shall be provided in accordance with Section 403. Additionally, areas in which stationary motor vehicles are operated shall be provided with a source capture system that connects directly to the motor vehicle exhaust systems.

Exceptions:

1. This section shall not apply where the motor vehicles being operated or repaired are electrically powered.

2. This section shall not apply to one- and two-family dwellings.

3. This section shall not apply to motor vehicle service areas where engines are operated inside the building only for the duration necessary to move the motor vehicles in and out of the building.

[F] 502.15 Repair garages. Where Class I liquids or LP-gas

are stored or used within a building having a basement or pit wherein flammable vapors could accumulate, the basement or pit shall be provided with ventilation designed to prevent the accumulation of flammable vapors therein.

[F] 502.16 Repair garages for natural gas- and hydrogen-

fueled vehicles. Repair garages used for the repair of natural gas- or hydrogen-fueled vehicles shall be provided with an approved mechanical ventilation system. The mechanical ventilation system shall be in accordance with Sections 502.16.1

and 502.16.2.

I hope this addresses your questions,

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Daniel Dittman, PE, CMVP

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NC DOI

Chief Mechanical Code Consultant

403.3 - Question: Table 403.3 states under public spaces for Elevator Cars, they must be exhausted at a rate of 1.0 cfm/sq ft. Who enforces this?

Answer: Elevators are under the jurisdiction of the North Carolina Department of Labor.

§ 143-139. Enforcement of Building Code. (d) Elevators. - The Department of Labor shall have general supervision of the administration and enforcement of those sections of the North Carolina State Building Code which pertain to elevators, moving stairways, and amusement devices such as merry-go-rounds, roller coasters, Ferris wheels, etc.

500 Chapter 5 Exhaust Systems

501.2.1 #3 - Question: What is the distance from a bath fan vent cap from a fixed window?

Answer: Zero, Section 501.2.1 #3 states environmental air must be 3 feet from operable openings into buildings.

501.2.1 #3 For all environmental air exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings into buildings for all occupancies other than Group U, and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious

501.2.1 - Question: I was recently turned down because I terminated my domestic range hood a couple feet over a door. I thought domestic range hoods were not considered grease duct?

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Answer: Domestic range hoods are not considered grease producing, they are classified as environmental air.

ENVIRONMENTAL AIR. Air that is conveyed to or from occupied areas through ducts which are not part of the heating or air-conditioning system, such as ventilation for human usage, domestic kitchen range exhaust, bathroom exhaust and domestic clothes dryer exhaust.

501.2.1 #3 NCMC (Both Residential and Commercial) requires the following:

3 feet from property lines

3 feet from operable openings into buildings for all occupancies except Group U

10 feet from mechanical intakes

501.2.1 Location of exhaust outlets

#3. For all environmental air exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings into buildings for all occupancies other than Group U, and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious.

501.2 - Question: Can the ventilation of a stationary storage battery system discharge to the return air plenum?

Answer: No, exhaust discharged shall discharge outdoors.

501.2 Exhaust discharge. The air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a nuisance and not less than the distances specified in Section 501.2.1. The air shall be discharged to a location from which it cannot again be readily drawn in by a ventilating system. Air shall not be exhausted into an attic or crawl space.

504.8 - Question: A contractor has common exhaust ducts for dryers and wanted to fire wrap the dryer in one hour fire wrap so it would be considered a shaft by code. Is this acceptable?

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Answer: Yes. Based on 504.8 Common exhaust systems for clothes dryers located in multistory structures. Where a common multistory duct system is designed and installed to convey exhaust from multiple clothes dryers, the construction of the system shall be in accordance with all of the following:

1. The shaft in which the duct is installed shall be constructed and fire-resistance rated as required by the International Building Code.
2. Dampers shall be prohibited in the exhaust duct. Penetrations of the shaft and ductwork shall be protected in accordance with Section 607.5.5, Exception 2.
3. Rigid metal ductwork shall be installed within the shaft to convey the exhaust. The ductwork shall be constructed of sheet steel having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage) and in accordance with SMACNA Duct Construction Standards.
4. The ductwork within the shaft shall be designed and installed without offsets.
5. The exhaust fan motor design shall be in accordance with Section 503.2.
6. The exhaust fan motor shall be located outside of the airstream.
7. The exhaust fan shall run continuously, and shall be connected to a standby power source.
8. Exhaust fan operation shall be monitored in an approved location and shall initiate an audible or visual signal when the fan is not in operation.
9. Makeup air shall be provided for the exhaust system.
10. A cleanout opening shall be located at the base of the shaft to provide access to the duct to allow for cleaning and inspection. The finished opening shall be not less than 12 inches by 12 inches (305 mm by 305 mm).
11. Screens shall not be installed at the termination.

505.2 - Question: Home owner wants to add additional exhaust to the kitchen. The exhaust is not a hood, just an exhaust fan in the ceiling, but it exceeds 400

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cfm. Will make up air be required for the additional exhaust since it is not a hood?

Answer: Yes, Section 505.2 states hoods that exceed 400 cfm must be provided with make up air. The intent is to prevent the dwelling from being under excessive negative pressure. Installing an exhaust fan that exceeds 400 cfm will produce the same results as a hood that exhausts 400 cfm.

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cfm (0.19 m3/s) shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

505.2 - Question: For domestic kitchen exhaust, is it acceptable to install a pressure switch in the make up air unit to bring on the unit rather than interlock it with the hood?

Answer: No, Section 505.2 requires the make up air unit to be controlled automatically to START and OPERATE simultaneously with the exhaust.

505.2 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cfm (0.19 m3/s) shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

507.9 - Question: I have a listed Type I hood. Can I use the Table 308.6 to reduce the required clearances in 507.9, even if my hood it listed?

Answer: Yes. The clearance reduction methods in Table 308.6 are applicable for equipment and appliances that are not listed for clearance to combustibles. UL710 is the test standard for listing factory built Type I hoods and is referenced in Section 507.1. The UL710 standard does not include testing for clearance to combustibles; therefore the listing does not address clearance to combustibles.

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The 18 inch clearance required by Section 507.9 may be reduced by application of Table 308.6. See attached interpretation from NCDOI

507.9 - Question: I am installing a hood and need to reduce the clearance to combustibles on the sides of the hood. A listed zero clearance hood simply has insulated panels, can I add insulation to the sides to reduce the clearance.

Answer: No, the hood must be listed as zero clearance or a listed kit specific for that hood must be installed to obtain the zero clearance rating. The hood is only part of the listing, the hood must also be paired with the correct fan to obtain a zero clearance listing

600 Chapter 6 Duct Systems

602.2 - Question: I am inspecting an above ceiling plenum and they have used a fire retardant plywood for the roof sheathing and it is exposed in the plenum. Is this allowed?

Answer: In this case it is allowed. The plywood used is manufactured by Hoover and was their pyro-guard. Attached are the specs on the plywood. Section 602.2.1 states materials within the plenum shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.
The pyro-guard plywood meets the flame and smoke index.
602.2 Construction. Plenum enclosures shall be constructed of materials permitted for the type of construction classification of the building.

The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125ºF (52ºC) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature. Air plenums

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formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

602.2.1 Materials within plenums. Except as required by

Sections 602.2.1.1 through 602.2.1.6, materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

603.17 - Question: Is access required to volume dampers located in a hard (sheetrock) ceiling? We are starting to see more enclosed ceilings (sheetrock, not lay in tile) because of the new energy code requirements. When volume dampers are installed above the ceiling access is required per 603.17. I believe the access is provided only to adjust the damper and is not intended to access the damper itself. It only serves as a means of adjustment. I am not requiring direct access for adjustment of volume dampers as long as remote access is provided. Access doors at each volume damper really make for a very ugly ceiling. The Architect would like to avoid this if possible. Will Mecklenburg County require access to each volume damper or will you approve the adjustment access only?

Answer: No. The remote access controls will meet the intent of the code. DOI actually recommend people use these where they have very tall ceilings or remote diffuser locations that would be difficult to access via a ceiling tile or access panel. Plus they have the added benefit of being so user-friendly there is a better chance of the system actually getting balanced correctly. They are more likely to actually stay put once the balancing is done. The McKimmon center at NC State, where the Building Code Council meets, has these.

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603.6.2.2 - Question: Can flexible foil air connectors, used on fireplaces, for combustion air or building exhaust, penetrate a wall or floor?

Answer: No, as per N.C. 2012 Mechanical Code 603.6.2.2: Flexible air duct connectors shall not pass through any wall, floor or ceiling.

607 - Question: Are dryer ducts installed in tenant separation walls, required to be wrapped inside the wall?

Answer: Dryer ducts are required to be wrapped when they penetrate a rated assembly. If the wall is a non-rated wall, such as a partition wall in an apartment, then the dryer duct would be required to be wrapped after it penetrates the top plate in the wall. At that point is entering the floor/ceiling assembly.
If the wall is a rated wall, such as a tenant separation wall, then the dryer duct is required to be wrapped from the point where is penetrates the assembly.

607.5 - Question: I am inspecting a commercial building. The fresh air duct enters the building and penetrates several rated walls before the air handler. How man dampers are required?

Answer: A fire damper would be required at each penetration.
607.5.2 Fire barriers. Ducts and air transfer openings that penetrate fire barriers shall be protected with listed fire dampers installed in accordance with their listing.

607.5.3 Fire partitions. Ducts and air transfer openings that penetrate fire partitions shall be protected with listed fire dampers installed in accordance with their listing.

607.5.5 - Question: Is there a reference in the code that specifically disallows a fire damper to be installed in a Type II hood exhaust duct that penetrates a rated wall?

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Answer: No. A fire damper will be allowed by the commercial code. An issue with residential is there may not be a fire damper that will work for the given situation. Even with the commercial code, It is not necessarily the best solution, but in our code, NCMC 607.5.5 Exception 5 addresses fire dampers that are not required if installed in accordance with the code. Of course, what that is saying is there is usually a shaft or other means of protecting the kitchen exhaust ductwork that penetrates a rated assembly. The fire damper still has to be suited for the exhaust stream it is going to be located in. Residential ranges are typically going into a rated floor/ceiling assembly and would require a radiation damper.

607.5.5 #2 - Question: When you have a shaft that complies with 607.5.5 #2. The sub ducts have to extend into the shaft a minimum of 22 inches and be made out of 26 gage. The last line of the section states, "the exhaust fan is powered continuously in accordance with the provisions of Section 909.11 of the International Building Code, and maintains airflow upward to the outdoors." Section 909.11 requires an approved standby power source. Does this mean they must install a generator? Can they use batteries?

Answer: Section 909.11 of the Building Code requires an approved standby power source. This is typically a generator, but if there is no other requirement of a standby power source other than the fan for the shaft, a battery system may be used. They battery will need to have the capacity to run the fan at full volume for no less than 90 minutes.

700 Chapter 7 Combustion Air

800 Chapter 8 Chimneys & Vents

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900 Chapter 9 Specific Appliances

1000 Chapter 10 Boilers & Water Heaters

1100 Chapter 11 Refrigeration

1200 Chapter 12 Hydronic Systems

1300 Chapter 13 Fuel Oil Piping

1400 Chapter 14 Solar Systems

Policy

Policy - Question: Are CO detectors required in hotel rooms?

Answer: No, we cannot find anything in the code to require CO detectors to be installed.

Other

Energy 403.2.1 - Question: What are the insulation requirements for ducts installed between floors?

Answer: Section 403.2.1 states Supply ducts located in semi-conditioned spaces are required to be insulated to R-4. A semi-conditioned space is defined as a space indirectly conditioned within the thermal envelope that is not directly heated or cooled. The joist space between floors would be a semi-conditioned space.

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403.2.1 also states there is no insulation requirement for return ducts in semi-conditioned space.

We have discussed this with Dan Dittman from NCDOI. We are reading the section correctly and will start enforcing it on December 1st, 2014. An email blast will go out on NotifyMe. See attached email from Dan Dittman.

403.2.1 Insulation (Prescriptive). Supply and return ducts in unconditioned space and outdoors shall be in insulated to R-8. Supply ducts inside semi-conditioned space shall be insulated to R-4; return ducts inside conditioned and semi-conditioned space are not required to be insulated.

Ducts located inside conditioned space are not required to be insulated other than as may be necessary for preventing the formation of condensation on the exterior of cooling ducts.

SEMI-CONDITIONED SPACE. A space indirectly conditioned within the thermal envelope that is not directly heated or cooled. For energy purposes, semi-conditioned spaces are treated as conditioned spaces.

Manufacture's Installation Instructions - Question: I am being told the CounterStrike brand CSST, doesn't have to be bonded. Is this true?

Answer: The manufacture's installation instructions requires CounterStrike to be bonded in accordance with NFPA 70 Article 250.104. See attached documentation.

250.104 (B) Other Metal Piping. Where installed in or attached to a building or structure, a metal piping system(s), including gas piping, that is likely to become energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or the one or more grounding electrodes used. The bonding jumper(s) shall be sized in accordance with 250.122, using the rating of the circuit that is likely to energize the piping system(s). The equipment grounding conductor for the circuit that is likely to energize the piping shall be permitted to serve as the bonding means. The points of attachment of the bonding jumper(s) shall be accessible.

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Energy - Question: Can economizers be used to provide the required ventilation?

Answer: Yes, an economizer is a mechanical device intended to reduce energy by using cool outside air as a means of cooling the indoor space. These devices can open and allow more outside air to enter the building when cooling or diluting building contaminants, but will go back to the default position, which can be positioned to provide the required ventilation.

403.5 (Energy) - Question: Contractor has rater requiring fresh air (outdoor) mechanical ventilation on residential building, is this a requirement?

Answer: No, 2012 N.C. Energy Code, Section R403.5, which is Mandatory, Exhaust shall have automatic or gravity dampers that close when the ventilation system is not operating. No mention is made for residential mechanical ventilation requirement for bringing in outdoor air. It is up to the Mechanical contractor or designer, using approved calculations, for requirements of outdoor air. Mechanical ventilation is an alternative to having natural ventilation. Requirements under Energy Code are intended to reduce infiltration when the ventilation Space conditioning and occupant comfort) systems are off. Requirements for occupant comfort, using load calculations, take into account, occupant requirements, and can be achieved using duct into space or other approved means, without code requirements of mechanical, constant, ventilation. Commercial is required, but is engineered.

Energy 403.2.2 - Question: When is a duct test required for systems installed in apartments?

Answer: A duct test is only required for the ducts installed outside of the building envelope, such as in the attic. The other ducts, even if between floors are still

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within the thermal envelope. Refer to the Energy Code Section 403.2.2 Exception #1

403.2.2 Exception #1

1. Duct systems or portions thereof inside the building thermal envelope shall not be required to be leak tested.

Other - Question: Mecklenburg County Health Department has a policy that requires CO detectors for dwelling units. Does this apply to all types of dwelling units, such as apartments, motels and hotels?

Answer: No, the Mecklenburg County Health Department Policy only applies to one and two family dwellings. See attached reference material. However, the state passed House Bill 74, which does require CO detectors for lodging establishments meeting certain conditions. Mecklenburg County Health Inspectors are enforcing House Bill 74, See attached reference material

Energy 403.1.2 & 503.2.4.1.1 - Question: I am installing heatpump units in some apartments, am I required to install a lockout for the electric heat?

Answer: Yes, Section 403.1.2(Residential) and 503.2.4.1.1(Commercial) of the Energy Code require heatpumps having supplementary electric-resistance heat to be provided with a lockout to prevent the supplemental heat from operating except in outdoor temperatures no lower than 35 F and no higher than 40 F. Both sections read similar, except the commercial section only applies to systems with a cooling capacity of less than 65,000 btu.

403.1.2 Heat pump supplementary heat (Mandatory Requirements). Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

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A heat strip outdoor temperature lockout shall be provided to prevent supplemental heat operation in response to the thermostat being changed to a warmer setting. The lockout shall be set no lower than 35°F and no higher than 40ºF.

503.2.4.1.1 Heat pump supplementary heat. Heatpumps having supplementary electric resistance heat shall have controls that, except during defrost, prevent supplementary heat operation when the heat pump can meet the heating load.

In systems with a cooling capacity of less than 65,000 Btuh, a heat strip outdoor temperature lockout shall be provided to prevent supplemental heat operation in response to the thermostat being changed to a warmer setting. The lockout shall be set no lower than 35°F and no higher than 40°F.